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EXAMINER	
YANG, CLARA I	

ART UNIT	PAPER NUMBER
2635	5

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/945,482	KANG, JONG-HOON	
	Examiner	Art Unit	
	Clara Yang	2635	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 May 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4 and 6-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4 and 6-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 August 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 4 May 2004 have been fully considered but they are not persuasive.

Regarding claim 1, on pages 11 - 12, the applicant traverses the examiner's Official Notice that the use of a signal amplifier is well known and requests evidence. Accordingly, the 35 U.S.C. §103(a) rejection has been modified to include U.S. Patent No. 5,874,896 (Lowe et al.), which teaches the use of a signal amplifier in a radio frequency identification (RFID) interrogator.

The applicant's arguments on pages 12 - 13 with respect to claims 4 and 6 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Reference sign "370" in Figure 5. Corrected drawing sheets, or amendment to the specification to add the reference character(s) in the description, are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The abstract of the disclosure is objected to because the amended abstract still exceeds the maximum word limit of 150 words. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1 and 7 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,986,570 (Black et al.) in view of U.S. Patent No. 5,874,896 (Lowe et al.).

Referring to claim 1, Black's radio frequency identification (RFID) interrogator 10, as shown in Fig. 2, comprises (a) microcontroller 18 for generating a frequency that corresponds to the carrier frequency of the system and defines a tag read range (see Col. 3, lines 39 – 40 and 53 – 65). Here it is understood that microcontroller 18 and drivers 14 form a transmitting or transferring unit (see Col. 3, lines 39 – 47). Per Black, interrogator 10 is able to suppress its carrier signal (i.e., generate a non-transfer period) in order to detect the presence of transponders 20 and when data collisions are detected (see Col. 5, lines 24 – 42), thereby providing (b) a gap signal generator for suppressing the carrier signal. Because interrogator 10 suppresses carrier signal 12 for a predetermined number of clock cycles when collisions are detected in order to sync the colliding transponders 20, interrogator 10's carrier signal suppression/non-transfer period is dependent on transponders 20 and the tolerance level anti-collision arbitrator 29 of each transponder 20, wherein anti-collision arbitrator 29 controls the

timing of the data to be transmitted to interrogator 10 (see Col. 4, lines 63 - 65 and Col. 8, lines 15 - 20). Still referring to Fig. 2, Black's interrogator 10 has a receiving unit formed by: (c) demodulator 14 or amplitude detector for detecting the amplitude of the received encoded data (see Col. 3, lines 61 - 67 and Col. 4, line 1); and (d) amplifier and filter 16 for filtering and amplifying the received encoded data (see Col. 4, lines 5 - 16). Black teaches that microcontroller 18 also functions as (e) a signal collision detector (see Col. 5, lines 35 - 37) and (f) a data decoder (see Col. 4, lines 16 - 20). Black's interrogator 10 further includes (g) series circuit 11 having an antenna coil (see Col. 3, lines 47 - 61). Black's interrogator 10 lacks a carrier signal amplifier for amplifying the carrier signal generated by microprocessor 18.

In an analogous art, Lowe teaches an RFID system 100, as shown in Fig. 1, comprising exciter/reader/writer (ERW) circuit 60 or reader and a plurality of RFID tags 58. Per Lowe, ERW 60, as shown in Fig. 3, has an exciter/writer 200 or transferring unit comprising (a) signal source 216 or carrier signal generator and (b) power amplifier 218 that amplifies the carrier signal (see Col. 6, lines 48 - 60). ERW 60 further comprises a signal conditioner circuit 202 and a demodulation and detection circuit 204 that form a receiving unit, wherein signal conditioner circuit 202 includes (c) a filtering and amplifying unit formed by filters 224 and 232 and amplifiers 228 and 234 (see Col. 6, lines 61 - 67 and Col. 7, lines 1 - 13). It is understood that demodulation and detection circuit 204 is a data decoder (see Col. 7, lines 14 - 28). As shown in Fig. 3, ERW 60 also has antenna coil 222.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Black's interrogator 10 as taught by Lowe because an amplifier connected to the output of interrogator 10's driver 14 provides a high current and

high voltage signal for powering and reading transponders 20 (see Lowe, Col. 6, lines 48 - 52), thereby extending interrogator 10's communication range.

Regarding claim 7, Black teaches that transponder 20 transmits a full data word when it is within a certain distance of interrogator 10 and receives sufficient power from interrogator 10 (see Col. 3, lines 61 - 65; Col. 4, lines 5 - 7; and Col. 5, lines 19 - 21 and 49 - 61).

Regarding claim 8, Black discloses that transponder 20, as shown in Figs. 1 and 3, has a parallel resonant LC circuit 21 or antenna, wherein circuit 21 is resonant at the carrier frequency of interrogator 10 and is electrically coupled to transponder integrated circuit 20 (see Col. 3, lines 22 - 24).

Regarding claim 9, Black's transponder 20, as shown in Fig. 3, has (a) memory 30 for storing data (see Col. 5, lines 19 - 21) and (b) clock generator 25 for establishing a non-transfer period with interrogator 10 (see Col. 4, lines 50 - 57 and Col. 6, lines 2 - 12).

6. Claims 4, 6, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,535,109 (Mahdavi) in view of U.S. Patent No. 5,874,896 (Lowe et al.), U.S. Patent No. 6,097,292 (Kelly et al.), and U.S. Patent No. 6,661,336 (Atkins et al.).

Referring to Claims 4 and 6, per Mahdavi, transponder systems include an interrogator or reader that transmits radio frequency (RF) pulses (i.e., a carrier signal of a predetermined frequency) and a plurality of transponders or RFID tags that receive the RF pulses and respond with identification data in the form of a modulate RF carrier (see Col. 1, lines 13 - 25). As shown in Fig. 6, Mahdavi's tag is passive and is powered by the reader (see Abstract and Col. 2, lines 53 - 55); hence the electromagnetic field strength of the reader's carrier signal defines a tag read range (see Fig. 1). Mahdavi's method, as shown in Fig. 2, comprises the steps of: (a) a reader transmitting an interrogation signal burst or carrier signal; (b) the reader generating and

transmitting an End Of Burst (EOB) signal or first gap signal at time t1; (c) tags 1 and 2 entering the reader field at time t1, determining that the amplitude of the interrogation burst is modulated upon detecting the EOB at time t2, and transmitting a Request To Send (RTS) signal (i.e., initial response) back to the reader after a random delay; (d) if a tag is outside of the reader's field of coverage, the reader transmitting another EOB signal at time t2 and waiting to receive an RTS signal; and (e) the reader receiving the RTS signal and determining if a valid RTS signal has been received. (See Col. 2, lines 15 - 25.) Because Mahdavi's tag is passive (see Fig. 6), Mahdavi's reader must (f) determine that the tag is within the reader's read range when the reader receives an RTS signal from the tag. If the random delay (RD) generators of tags 1 and 2 happen to generate the same delay after the EOB signal at time t2, tags 1 and 2 will transmit their RTS signal at the same time, causing the reader to (g) detect a data collision (see Col. 2, lines 42 - 48). Since the reader fails to detect a valid RTS signal due to the collision, the reader (h) continues the periodic EOB signal transmission until the random delays generated in the tags are different, as indicated in Fig. 3 at time t2 (see Col. 2, lines 48 - 52). Consequently, the generation of the EOB signals (or first gap signals) are dependent on that tags and a tolerance level of each tag's RD generator or electric device. If the reader receives a valid RTS at time t3 in Fig. 2 or time t4 in Fig. 3, the reader (i) transmits a Clear To Send (CTS) burst or second gap signal, causing tag 1 to transmit its data to the reader and tag 2 to refrain from sending its RTS signal (see Col. 2, lines 25 - 35). Per Mahdavi, tag 1 transmits its data upon receiving the CTS burst until receiving another EOB burst from the reader at time t4 in Fig. 2 or time t5 in Fig. 3 (see Col. 2, lines 35 - 41). Mahdavi, however, fails to teach the steps of (1) the reader amplifying the carrier signal prior to transmission, (2) the reader verifying the tag's data format, (3) the reader rereading the tag's data if the tag's data format is invalid, and (4) the reader generating a

gap signal to notify that the data transfer is complete, wherein the gap signal is shorter than the EOB signal.

In an analogous art, as explained above in claim 1, Lowe teaches an RFID system 100, wherein ERW 60, as shown in Fig. 3, comprises power amplifier 218 that amplifies the carrier signal (see Col. 6, lines 48 - 60).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Mahdavi's reader as taught by Lowe because an amplifier connected to the power output of the reader provides a high current and high voltage signal for powering and reading the transponders (see Lowe, Col. 6, lines 48 - 52), thereby extending the reader's communication range.

In an analogous art, Kelly teaches a contactless data exchange system comprising of host computers, target RF terminals or readers, and a plurality of tags. Per Kelly, target 104 and tag 106 (see Figs. 1 and 2) exchange data via a half-duplex communication protocol (see Col. 5, lines 53 - 56); thus Kelly's target 104 must cease data transmission (or transmit a gap signal) to tag 106 in order for tag 106 to transmit its data. Kelly's method, as illustrated in Fig. 6B, includes: (a) target 504 transmitting a "wakeup" signal on a carrier frequency of 13.56 MHz at step 604 (see Col. 5, lines 54 - 56 and Col. 11, lines 14 - 16); (b) the target transmitting a gap signal in order to receive a "ping" signal from tags that are present in the RF field at step 606 (see Col. 11, lines 16 - 17); (c) tags 502 and 510 receiving the "wakeup" signal at steps 605 and 605A, generating a random wait period, and transmitting a "ping" signal after the random wait period has expired at steps 608 and 608A (see Col. 11, lines 20 - 30); (d) target 504 receiving the "ping" signal and determining if the "ping" signal is good at step 610 (see Col. 11, lines 32 - 37); (e) if an incoherent "ping" signal is received due to collision, target 504 transmitting a

"ponginvalid" signal to tags 502 and 510 at step 612, causing tags 502 and 510 to transmit another "ping" signal after another randomly generated wait period (see Col. 11, lines 39 - 52); and (f) if a recognizable "ping" signal is received, target 504 immediately transmitting a "pongvalid" signal at step 620, causing tag 502 to transmit an "imawake" signal at step 628 and any tag (i.e., tag 510) that has yet to transmit a "ping" signal due to its randomly generated wait period to remain silent at step 632 (see Col. 11, lines 53 - 64). As shown in Fig. 4B, Kelly's target periodically transmits a "wakeup" signal, which is followed by a gap signal while waiting for a tag's "ping" signal, if tags are outside the target's RF field (see Col. 10, lines 15 - 19). Per Kelly, an "imawake" signal includes a synchronizing character, a tag identification number, a pseudo-random number generated by the tag for authentication, a message, and a message authentication code (MAC), which is used to check for transmission errors and message authenticity (see Col. 10, lines 43 - 47 and Col. 14, lines 21 - 24 and 34 - 36). Kelly imparts that if an incorrect MAC is received from a tag, Host 102 causes the target to repeat the data exchange process enough times to rule out transmission error as the cause of the problem (see Col. 14, lines 37 - 52). Consequently, Kelly teaches the steps of (1) verifying a tag's data format and (2) rereading the tag's data if the tag's data format is invalid (see Col. 11, lines 65 - 67 and Col. 12, lines 1 - 15).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Mahdavi as taught by Kelly because the steps of verifying a tag's data format and rereading the tag's data if the tag's data format is invalid improve system reliability and security by detecting transmission errors and incorrect inputs.

In another analogous art, Atkins teaches a method for preventing data collision in an RFID system, as shown in Fig. 3, that comprises the following steps: (a) reader 10 transmitting a

radio frequency (RF) reader signal or carrier signal at time t_0 (see Col. 5, lines 40 - 45 and Col. 7, lines 33 - 36); (b) a number of passive transponders (tag 1, tag, 2, and tag 3) receiving reader 10's signal, generating power from the reader signal, and executing a random wait cycle before transmitting a response (see Col. 5, lines 47 - 50 and 57 - 58); (c) reader 10 receiving a signal 20 from tag 1 at time t_1 and transmitting a mute instruction 21 (i.e., amplitude modulation) or first gap signal at time t_2 in order to mute tags 2 and 3 (see Col. 5, lines 58 - 67); (d) the other tags detecting the short gap or amplitude modulation and pausing their random wait timers (see Col. 6, lines 45 - 62); (e) reader 10 reading signal 20 of tag 1 (see Col. 6, lines 10 - 15); (f) reader 10 transmitting an acceptance instruction 22 or second gap signal at time t3 in order to notify that tag 1's signal has been successfully received and that tags 2 and 3 are to resume their random wait cycles (see Col. 4, lines 7 - 11 and Col. 6, lines 15 - 21). The process is then repeated for tags 2 and 3. Though Atkins teaches that mute instruction 21 is a short gap and that acceptance or disable/wakeup instruction 22 is a long gap (see Col. 5, lines 59 - 61 and Col. 6, lines 40 - 49), it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the acceptance instruction 22 such that it is shorter than mute instruction 21 since Atkins imparts that both instructions can take various forms and that in one form, acceptance instruction 22's duration is different from that of mute instruction 21 (see Col. 4, lines 1 - 18).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Mahdavi as taught by Atkins because the step of generating a gap signal to notify that data transfer is complete reduces collisions by preventing the other tags from transmitting until the data from a first tag is properly read.

Regarding claim 10, Mahdavi's tag, as shown in Fig. 6, has an antenna and components (rectifier/power supply, EOB detector, random delay generator, control unit, RTS generator, data memory, and modulator), which are understood to form an integrated circuit that is electrically coupled to the antenna. Because (1) Mahdavi teaches that the reader powers the tag and (2) it is known by those of ordinary skill in the art that efficient power transfer is achieved when a tag's antenna is tuned to the resonant frequency of the reader, it is understood that the tag's antenna is matched to the reader's resonant frequency.

Regarding claim 11, Mahdavi's tag has a data memory for storing data that is to be transmitted to the reader upon interrogation and a random delay generator or timer for establishing a non-transfer period (see Fig. 6 and Col. 2, lines 17 - 25, 29 - 31 and 35 - 37).

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Clara Yang whose telephone number is (703) 305-4086. The examiner can normally be reached on 8:30 AM - 7:00 PM, Monday - Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Horabik can be reached on (703) 305-4704. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CY
29 June 2004

BRIAN ZIMMERMAN
PRIMARY EXAMINER